

REMARKS

Claims have been carefully reviewed in light of the Examiner's action.

Claims 9- 14 have been amended to overcome objection as being in improper form of multiple dependency on other multiple dependent claims, i.e. their dependency on claim 6 has been removed.

New claims 20, 21, 22 and 23 have been added, being identical to corresponding claims 9, 10, 11 and 14, except they are dependent on claim 6. Additionally, claims' 12 and 13 dependency on claim 5 has been also removed.

Claim 7 has been amended to overcome claim's 8 rejection based on being indefinite, i.e. the "active materials" have been added therein, and the solvents have been clearly specified, and are supported by the Specification.

All claims have been broadened to include capacitors, which are also supported by the Specification. Most of capacitors are not lithium based, and thus the prior claims would be too limited.

No new matter has been added.

Taking claims in detail, attention will be given to the prior art patents cited by the Examiner.

The Examiner rejected claims 1-4 and 15-18 as being anticipated by Kejha's US patent No. 5,443,602 and application No. 08 / 281,011.

Applicants defend these claims on the grounds, that Kejha described in '602 patent a vertical dip-coating method of carbon fibers with a different drive system, and does not even remotely suggests in either document, that metal grids, expanded

metal foils, perforated metal foils and solid metal foils can be dip-coated by active materials of electrodes, and be used in such structures of the electrodes.

The application No. 08/281,011 was abandoned, but later resulted in the US patent No. 5,750,289. However, none of these documents describe metal grids, expanded metal foils, perforated metal foils, or solid metal foils. Both of these documents describe only expanded or perforated metalized plastic films or nets to be used as current collectors and carriers, which are very different composite structures, comprising two or three layers of different materials: a plastic film or net layer, and one or two metal layers on the surface of the plastic. Instant invention claims only one metal layer current collector.

The principal object of the US Patent No. 5,750,289 and the application No. 08/281,011 of Kejha is to provide lightweight current collectors to increase the energy density of the battery, but because of their lightweight plastic layers taking the sectional space, they can not match the applicants' full one metal layer collectors having the same total thickness, in high rate current carrying conductivity, or power density, (and still achieving a reasonably good energy density of the battery). This is one of the main objects of the instant invention (page 5, lines 19-21 and page 11, lines 7-11), and also the reason for this patent application. It is self-evident, that the thicker metal can carry higher electric current. This differentiates the invention from the prior art, and therefore claims 1-4 and 15-18 should be allowed.

The Examiner rejected claims 5-8 and 19 as obvious over Kejha's '602 patent in view of Andersen's et al. US patent No. 6,280,879.

Applicants believe that these claims should be allowed, because Kejha in '602 patent does not even remotely suggests, or describes the current collectors and structures as claimed in this invention, and as explained above, and because Andersen at al. in '879 patent describe primers of various compositions, which are used on the current collectors surface to prevent corrosion by electrolyte and electrode material.

Applicants use primers of different compositions and for different reasons :

1. To promote adhesion of the active material coating to the collectors (page 4, line 12);
2. The primers of the invention must be solvent resistant, so they do not wash-off in the active materials' slurries when vertically dip-coated, (and are staying in the dip tank relatively long time), which is critical in the method of the invention (page 4, lines 19 and 25, page 12, line 27, page 13, line 6).

These features are not taught or claimed by Andersen at al., because they do not need these features, due to their totally different method of coating.

Additionally, there is no suggestion of combining references cited by the Examiner, in the references themselves, or any desirability of such combining.

Of course, all current collectors primers must be electrically conductive, which is well known in the art.

With regards to claims 7 and 8, on the contrary --- Andersen at al. in '879, and Kejha in '602 patents do not teach, suggest or specify even remotely the use of at least two solvents of different speed of evaporation (= different boiling points) in the coating slurries, which is another embodiment of the invention. (Page 11,

lines 3-6). Andersen at al. just provide a list of preferred individual solvents (column 7, lines 55-66).

For example, if only one of the Andersen's solvents will be used in the dip-coating slurry, such as a high boiling point and heavy solvent NMP, which dissolves very well PVDF homopolymer binder, the vertical dip-coating will not solidify and will not adhere to the (slippery) metal collector, and will run-off from the collector immediately after emerging from the dip tank.

If another one and only low boiling point and lightweight Andersen's solvent, such as a ketone or THF will be used in the dip-coating slurry, this solvent will not dissolve the PVDF homopolymer binder, and the vertical dip-coating will not adhere to the metal collector after drying, and then will crumble-off.

The best mode of coating of the invention is achieved by a critical combination of selected solvent-resistant, adhesion-promoting and electrically conductive primers, with the use of at least two solvents of different boiling points (= speed of the evaporation) in the slurry.

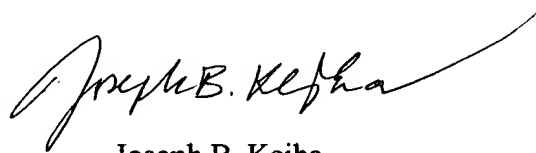
This would not be obvious to a person of ordinary skills, while using teaching of Andersen at al. and Kejha, and thus would not achieve the same results as applicants, mainly because Andersen at al. use a totally different method of coating.

The preferred materials and their ranges in the slurry composition are claimed in claim 8, dependently on claim 7, which was amended. Andersen at al. disclose a similar slurry or paste, but without the critical combination of the two solvents as claimed. Additionally, claims 7 and 8 are dependent on claims 1, 2, 3, or 4 with all of their limitations.

It is believed that the claims define new and unobvious subject matter.

Accordingly, it is believed, that the Amendment places the Application in condition for allowance and such action is requested and urged.

Respectfully submitted,

A handwritten signature in black ink, reading "Joseph B. Kejha". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Joseph B. Kejha
(applicant)